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Spaceport News

John F. Kennedy Space Center - America's gateway to the universe

Cape Crusaders support, strap in shuttle crew

By Steven Siceloff
Spaceport News

The crew of space shuttle Endeavour will climb into the crew compartment shortly before sunrise on Monday ahead of the scheduled liftoff at 8:56 a.m. Heading up the launch tower and getting to the hatch, they will be greeted by the Closeout Crew and once they get inside the shuttle, other astronauts will help them into their seats as the shuttle stands on its tail pointed to the stars.

It is that second group of astronauts, the ones not flying, that is responsible for making sure the Endeavour crew commanded by Mark Kelly is ready to go when the engines ignite on STS-134.

After all, astronauts climbing into a space shuttle are typically thinking about lots of things, from trajectories and abort scenarios to systems and when to talk to the launch team and mission controllers. Not to mention the pure excitement that comes with getting ready to go into orbit.

They might not be thinking so much about strapping themselves into the seats on the shuttle.

"You've got your mind on a lot of stuff when you're getting into the shuttle and getting ready to launch into space," said astronaut Stan Love, a mission specialist on the STS-122 mission. "And hooking up connections isn't always top of your priority list."

That's why the crew gets help from other astronauts who get into the shuttle with them but have no intention of flying that day. Those astronauts are known formally as Astronaut Support Personnel, but they go by several names, including ASPs, Cape Crusaders because they are assigned to NASA's Kennedy Space Center in Florida, or just C-squareds.

Chris Hadfield, a Canadian astronaut who flew on STS-74 and STS-100, worked as an ASP before his first flight. He credits the experience with teaching him the details of launch day.

NASA/Kim Shiflett

NASA astronaut Shane Kimbrough is in the White Room at Launch Pad 39A helping the STS-134 crew strap into space shuttle Endeavour during the Terminal Countdown Demonstration Test (TCDT) on April 1, just as he will on launch day.

"Working at the Cape as a Cape Crusader, C-squared, whatever you want to call it," Hadfield said, "I learned so much about how the vehicles get ready, about the attitude at KSC, and about what it is to be one of the crew members getting in and out of the vehicle."

It's not as easy as putting on a seatbelt, after all. For one thing, on launch

See **CRUSADER**, Page 3

Cabana shares perspective on current, future direction

By Linda Herridge
Spaceport News

Kennedy Space Center Director Bob Cabana told a packed audience at the National Space Club Florida Committee luncheon, May 10, that NASA is not going out of business and Kennedy is not closing its doors after the last space shuttle launch during his KSC: Framing the Future presentation.

Cabana touched on current work including preparing for the next space shuttle launch, the Launch Services Program, International Space Station, NASA's budget and continuing resolution and what the future holds for the center.

"We're on track for Endeavour's launch, May 16, at 8:56 a.m.," Cabana said. "The crew is in great spirits and they'll be back at Kennedy this Thursday for our Monday morning launch attempt."

Cabana said with all the change going on at the center, there's been one constant, the Launch Services Program, which continues to do an outstanding job supporting NASA's science missions with expendable launch vehicles (ELVs).

Currently, there are five NASA ELV launches remaining this year, and three of those will launched from nearby Cape Canaveral Air Force Station.

Juno is a five-year mission to Jupiter. The Gravity Recovery and Interior Laboratory (GRAIL) is a mission to the moon and NASA's Mars Science Laboratory (MSL) with its Curiosity rover will be the largest rover to explore Mars.

"MSL is really an awesome mission and some of the flight support hardware has already arrived at Kennedy," Cabana said.

The International Space Station has been occupied by humans for nearly 11 years, beginning with Expedition 1 that docked Nov. 2, 2000. To date, more than 200 people from eight different countries have visited the space station.

"We will have astronauts living and working on the space station until at least 2020, and Kennedy

See **CABANA**, Page 2

Inside this issue...

NASA Explorer Schools dare students to dream big

By Rebecca Regan
Spaceport News

Inspiring the next generation of explorers, scientists, engineers and educators to "dream big" was the goal of this year's NASA Explorer Schools Symposium at Kennedy Space Center.

The symposium kicked off May 4 with a welcome dinner in the company of Bob Cabana, Kennedy's director and a former space shuttle astronaut. About 60 fourth- through 12th-grade students and their teachers listened as Cabana shared a vivid memory of seeing shuttle Endeavour awaiting liftoff on Launch Pad 39A with a remarkable rainbow overhead. Later that day in December 1998, Cabana and his crew would lift off on the 12-day STS-88 mission to begin construction of the International Space Station.

"Our very first day in orbit, the wake up music was Judy Garland's, 'Somewhere Over the Rainbow. It brought tears to my eyes," Cabana said. "Somewhere over the rainbow dreams do come true because that was a dream mission from start to finish."

CLICK ON PHOTO *NASA/Kim Shiflett*

A student participates in a hands-on activity during the NASA Explorer Schools Symposium at Kennedy Space Center on May 6. To read the full story, click on the photo.

The symposium participants were competitively selected after they completed an original investigation focused on existing NASA missions or research interests and presented it to the space agency via the Digital Learning Network. As their reward, they spent four days at the space center.

Luis Rabelo, a project manager for NASA's Experimental Program to Stimulate Competitive Research, or EPSCoR, was on hand to listen to the students' presentations and explained the multitude of career paths the space agency offers, including studying Earth's climate, the sun, the solar system, or galaxies and black holes, as well as designing and launching rockets and capsules that will travel to low Earth orbit and beyond.

"Keep learning," Rabelo said. "Continuous learning is so important because science is always changing."

Fifth-graders Nell Curtin and Hazel Thurston from K.W. Barrett Elementary in Arlington, Va., and their classmates developed a sports game for space, called "Save the World," using Sir Isaac Newton's three laws of motion for their investigation. The project was awarded the "NASA Sports Challenge" and will be played aboard the International Space Station later this year, with a few modifications. The goal is for astronauts to gather objects and build devices to save the planet, which actually is just a large, soft ball, from incoming meteorites.

Thurston ended their presentation with a small piece of advice for the space participants: "Play safe."

Curtin said if she could ask the astronauts questions after they played, they would be, "Who won?" and "What was the most challenging part?"

The symposium's career panel boasted a wide variety of Kennedy employees, from a wildlife ecologist and human resource specialist to a chemist, engineer and contracting officer.

"When I was in fourth-grade, I was only interested in Girl Scouts and soccer," chemical engineer Annie Caraccio said. "So congratulations . . . I look forward to seeing you accomplish great things and working with you in the future."

Afterward, the students participated in hands-on educational and skill-building activities. Elementary students built miniature robots and high schoolers built speakers.

As he worked on his speaker, Fernando Zamora-Jimenez, an eighth-grader from High Point, N.C., said, "From this experience, I've learned that if you try your hardest, there really are rewards."

In the past, the NASA Explorer School Symposium only was open to fifth- through ninth-grade students. Priscilla Moore, an education specialist at Kennedy, said adding older students delivers NASA educational content to many more.

"The NASA Explorer Schools mission is to be the agency's classroom-based gateway to middle and high school students," said Moore, "inspiring them to participate in NASA missions and develop their aptitudes in science, technology, engineering and math."

From **CABANA**, Page 1

will be processing payloads for commercial partners like SpaceX to ferry to the station beginning in 2012," Cabana said. This extension will expand the station's scientific, technological and educational development potential to drive science and technology that will deliver benefits to humanity.

With regard to NASA's budget and continuing resolution, Cabana said: "These are difficult economic times we are in. NASA's budget will remain flat in the years ahead, and it's crucial for us to invest wisely and become more efficient if we are going to meet the president and NASA administrator's challenge to out-educate, out-innovate and out-build the rest of the world."

Cabana said NASA has established the Commercial Crew Program Office at Kennedy to manage the commercial space activities that will be critical to the nation's future spaceflight. The effort includes a recommended $4.25 billion throughout five years for the development of commercial crew systems, including $850 million in the president's budget for next year.

"We're making progress with plans to develop a new space launch system and Multi-Purpose Crew Vehicle, with a recommended investment of $14 billion over the next five years, including nearly $3 billion in the next year's budget," Cabana said.

Kennedy will implement the 21st Century Ground Systems Program to modernize its facilities for multiple commercial and government customers. Cabana said Kennedy will partner with commercial, the Department of Defense, state and federal agencies to prioritize and modernize launch assets, and provide the capability to support production, processing and recovery of space systems.

"These Space Act Agreements will allow us to take advantage of American ingenuity to get to low Earth orbit, so NASA can focus on the future of deep space exploration," Cabana said.

Kennedy's Center Planning and Development Office was formed in October 2008, and reorganized in June 2010, to help Kennedy move forward with new partnerships.

"Partnerships are going to be key in our future," Cabana said. "The mission of this organization is to facilitate retention of the highly skilled aerospace work force, as well as Kennedy's facility assets by attracting new businesses to establish a presence on or near the center."

Cabana said work continues to define the architecture for exploration beyond Earth. He said the 21st Century Ground Systems Program Office at Kennedy will provide the necessary program management for the ground infrastructure development and ground operations integration to support multiple government and non-government users.

Cabana said Kennedy will lead in some areas of technology capabilities with participation from other NASA centers. Among these capabilities will be life sciences and habitation systems, space launch and suborbital technologies and tracking, timing, communications and navigation technologies.

"Kennedy is going to be integral for the future," Cabana said. "We have a lot of great work coming our way."

NASA, space community remember 'Freedom 7'

By Anna Heiney
Spaceport News

On the morning of May 5, 1961, astronaut Alan Shepard crawled into the cramped Mercury capsule, "Freedom 7," at Launch Complex 5 at Florida's Cape Canaveral Air Force Station. The slender, 82-foot-tall Mercury-Redstone rocket rose from the launch pad at 9:34 a.m. EST, sending Shepard on a remarkably successful, 15-minute suborbital flight.

But more than that, it kick-started America's future as a spacefaring nation.

On the 50th anniversary of Shepard's pioneering flight, his three daughters, Laura Churchley, Julie Jenkins and Alice Wackermann, joined former space workers and their families, community leaders and others on the same launch pad to celebrate the flight and its legacy.

"In the audience today, we have more than 100 workers from the Mercury era who devoted their lives to flying humans safely in space," said Kennedy Center Director Bob Cabana. He asked them to stand, and they were greeted by a round of applause.

"You should be extremely proud of what you did for our country and for humankind," Cabana said.

NASA/Kim Shiflett

Invited guests tour the blockhouse at Complex 5/6 on May 5 during a celebration of Alan Shepard's historic flight 50 years ago. From left are Robert Sieck, former shuttle launch director; Andy Anderson, former manager for communications in the Mercury Mission Control Center; Bob Moser, former chief test conductor for the Mercury-Redstone launches; and John Twigg, former backup chief test conductor for the Mercury-Redstone launches.

The flight of "Freedom 7" boosted spirits throughout the country at a time when the U.S. appeared to be faltering in the quest for a viable space program. Just weeks before, on April 12, 1961, Russian cosmonaut Yuri Gagarin had become the first human in space, orbiting the Earth for 108 minutes in the Vostok 1 spacecraft.

A U.S. Navy test pilot, Shepard was one of the first astronauts selected by NASA. The "Mercury Seven" astronauts -- M. Scott Carpenter, Leroy Gordon Cooper, John H. Glenn Jr., Virgil I. "Gus" Grissom Jr., Walter M. "Wally" Schirra Jr., Donald K. "Deke" Slayton, and Shepard -- were introduced to the nation in April 1959. NASA kept the identity of the first astronaut to fly a secret until word of Shepard's command got out just days before the launch.

After ignition, Shepard reached up to start the mission clock. The vehicle experienced some vibration about a minute and a half into flight when it pierced the area of peak aerodynamic pressure, but Shepard enjoyed a smoother ride as the Redstone pushed skyward. Once the Mercury spacecraft separated from the rocket, the capsule turned, with its heat shield facing forward. During the short flight, Shepard took in the amazing view and experimented with the spacecraft's controls.

At the anniversary event, the entire flight was replayed in a video that began five minutes before launch time, with liftoff and landing at the precise moment when Shepard began and ended his mission 50 years ago.

"It was an intense countdown. Everybody had their job. There was no joking around," said former Chief Test Conductor Bob Moser. "But we enjoyed it, and it worked. Congratulations to all of us. We were a great team."

The flight was significant not only because it displayed bravery and technological progress, but also because it played out before journalists and the public. For the first time, the world was able to share in the tension and excitement as the historic event unfolded on television in real time.

"To me -- and I've gone through hundreds of launches and done countdowns in hundreds of launches -- the first is always very special," said Jack King, former chief of NASA's Public Information Office, now called Public Affairs. "I must admit, it's the only one when I was misty-eyed. The first American in space! I couldn't be prouder. And I couldn't be prouder for being a part of it."

"Freedom 7" was only the beginning of Shepard's spaceflight career. He went on to serve as chief of the Astronaut Office after his first flight. In 1971, he commanded the Apollo 14 mission, landing along with Lunar Module Pilot Edgar Mitchell in the Fra Mauro region originally intended as Apollo 13's target while Command Module Pilot Stuart Roosa orbited overhead.

"I remember every time he spoke, he always gave credit to everyone in NASA who built the good ships that brought him home to us safely," Churchley said. "We thank you all very much."

Human spaceflight has changed dramatically in the ensuing half-century. A space shuttle flight is typically about two weeks; long-duration increments aboard the massive International Space Station last several months. Today's space missions are intricate and complex, requiring years of training and rehearsal, with crews of five, six or seven astronauts working together on a single flight. Rather than a race to the finish, a spirit of international cooperation provides a backdrop for today's space program.

"It's an honor to share this day with so many people who helped NASA pioneer human spaceflight and enable the agency's many accomplishments throughout our existence," NASA Administrator Charles Bolden said. "I salute all of you."

From **CRUSADER**, Page 1

day the shuttle's nose is pointed skyward, so the crew really does have to climb into their seats because they are tilted 90 degrees. Getting in place means wriggling in on their backs and lifting their legs over their heads.

There are plenty of things to get used to the first time an astronaut gets in a shuttle seat to fly, said Steve Swanson, a mission specialist aboard STS-117 and STS-119.

"The first time you get in there for real, it's amazing," Swanson said. "You're walking on the back wall, you consider that that's the actual ground now. You have to really figure all that out. That's the first time you really get to do all that."

Plus, the astronauts are wearing partial pressure suits -- the bulky, orange flight suits that are designed to help the crew survive an emergency. The ensembles are more commonly referred to as "pumpkin suits" and they have numerous fittings and connections that have to be prepped before liftoff.

The ASPs work closely with the Closeout Crew -- a team of technicians who work through the choreography to get six or seven astronauts in place quickly and precisely.

"It's a very well-polished process," Hadfield said. "The Closeout Crew up in the White Room really know their job. They're experts and see us astronauts roll through and they take good care of us and they make sure we don't miss a step. And you as the Astronaut Support Personnel, you're helping with that process, but really those guys have the responsibility."

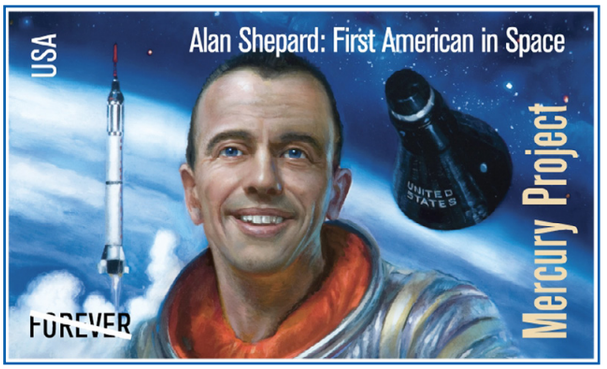
Because everyone going to the crew compartment is standing on a wall instead of a floor and reaching toward areas they aren't all that used to, the switches throughout the orbiter have to be looked after, too, to make sure they are in the right position.

Hadfield said his appreciation of his own launch days was heightened by his time as an ASP.

"Having worked here as an astronaut support crew, if anything, it gives you more confidence, more understanding," Hadfield said. "It therefore makes your readier for the time when the engines light."

First American in space, MESSENGER earn stamp

By Steven Siceloff
Spaceport News



A young, grinning Alan Shepard adorns a new stamp released May 4 to celebrate the astronaut's history-making launch 50 years ago to become the first American in space. Shepard's flight of just 15 minutes on May 5, 1961, marked the first steps of a national effort that sent astronauts to the moon and back eight years later.

Opposite Shepard in the stamp set is a depiction of the MESSENGER spacecraft as it entered Mercury's orbit in March, the first spacecraft to orbit the planet closest to the sun. Together, the designs bookend a time span during which NASA launched some 1,500 missions, including uncrewed probes to distant worlds and the edge of the solar system.

"These stamps, which will go out by the millions across this country, are a testament to the thousands of NASA men and women who shared dreams of human spaceflight and enlarging our knowledge of the universe," said Charlie Bolden, NASA administrator and former astronaut during the stamps' unveiling at the Kennedy Space Center Visitor Complex. Both missions launched from Cape Canaveral Air Force Station adjacent to the space center.

"Today we celebrate the 50th anniversary of many, many important issues, among them is the first steps from the home planet that were taken by the family of man," said Scott Carpenter, one of the Mercury astronauts who, like Shepard, flew the one-man capsule into space.

President John F. Kennedy set America on a course for the moon soon after Shepard's mission ended, even though the nation had not accomplished even a day's experience in space.

"That was largely a response to Alan's success," Carpenter told the crowd assembled at the visitor complex's Rocket Garden.

Shepard and Carpenter were two of seven test pilots chosen by NASA in April 1959 to form its first class of astronauts. Shepard was 38 at the time of his Mercury mission but did not fly again for 10 years when he commanded the Apollo 14 mission and walked on the moon. An inner ear condition called Meniere's Disease grounded the astronaut and he instead served as chief of the Astronaut Office before surgery corrected his condition and he began training for the moon landing.

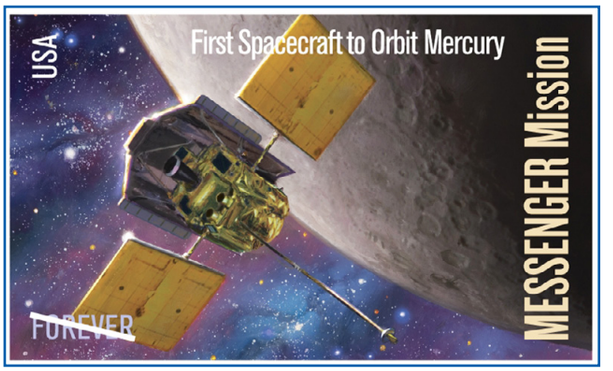
Little of Shepard's flight would be recognizable to those accustomed to watching space shuttles launch into space, construct a space station and then glide back to Earth. For example, Shepard was flying in a capsule that did not have a forward-facing window, but a periscope that he deployed a few minutes after liftoff. Shepard and his capsule splashed down in the Atlantic Ocean after descending under parachutes.

The Redstone rocket used a single engine to hurl Shepard and his "Freedom 7" Mercury capsule on a ballistic arc 116 miles into space and more than 300 miles from its launch pad. That single engine generated about 78,000 pounds of thrust. For comparison, the escape rocket on top of the Apollo/Saturn V produced nearly twice that of the whole Redstone.

"It's an impressive thing to think about how explorers and scientists have worked hand-in-hand," said Jim Adams, NASA's deputy director of Planetary Science. "As exploration and science work together in the future, we all look forward to what the future holds."

Donato Giancola of Brooklyn, N.Y., and Phil Jordon of Falls Church, Va., worked together on the stamp designs. Giancola has received dozens of awards for his illustrations of science fiction and fantasy books. The designs are based on NASA images.

"A decision was made not to put 44 cents on the stamp, but it is forever," Carpenter said. "It is appropriate to the time we should honor and remember Alan B Shepard and Freedom 7."



Former Kennedy Space Center Director Lee Scherer dies at 91

By Rebecca Regan
Spaceport News

Lee Scherer, the second director of Kennedy Space Center, died Saturday morning in his San Diego home. He was 91.

Scherer was born in Charleston, S.C., on Sept. 20, 1919. He attended the University of Kentucky, was a 1942 graduate of the U.S. Naval Academy and a retired naval aviator.

He also received a master's degree in aeronautical engineering from the California Institute of Technology and a doctorate from the University of Central Florida.

From 1967 to 1971, he led the Apollo Lunar Exploration Office at NASA Headquarters in Washington and helped pick out landing sites and exploration opportunities for the first human expedition on the moon.

In 2009 as the nation was celebrating the 40th anniversary of Apollo 11, Scherer talked to the

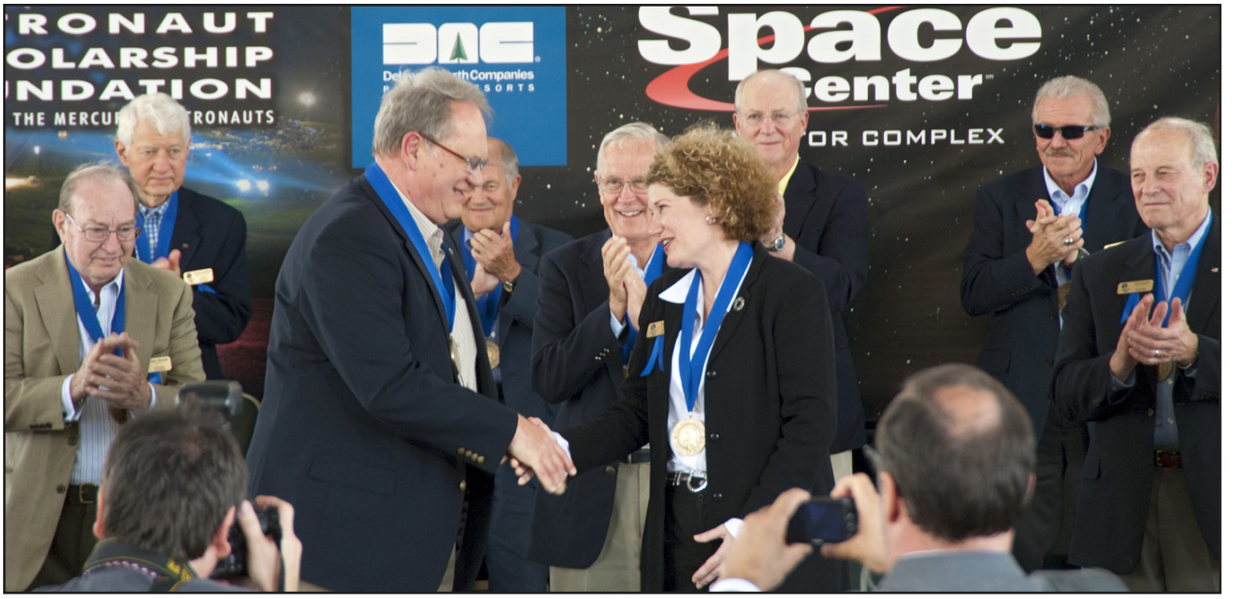
See **SCHERER**, Page 5

CLICK ON PHOTO

On May 21, 1976, Lee Scherer, Kennedy Space Center's second director, landed the first plane on the Shuttle Landing Facility. For more photos of Scherer, click on the photo.

Bobko, Helms join U.S. Astronaut Hall of Fame

By Steven Siceloff
Spaceport News



CLICK ON PHOTO *NASA/Jim Grossmann*

Karol "Bo" Bobko and Susan Helms shake hands during their induction into the U.S. Astronaut Hall of Fame at the Kennedy Space Center Visitor Complex on May 7. To learn more about the U.S. Astronaut Hall of Fame, click on the photo.

One of the Space Shuttle Program's earliest commanders and the first woman to live on the International Space Station took their places alongside the nation's space heroes May 7 as they were welcomed into the U.S. Astronaut Hall of Fame.

Karol "Bo" Bobko and Susan Helms joined the Hall of Fame during a ceremony at the Kennedy Space Center Visitor Complex. The celebration came two days after NASA marked the 50th anniversary of Alan Shepard's flight in 1961 that made him the first American in space.

Bobko flew as the pilot on STS-6, the first flight of space shuttle Challenger, in April 1983. Two years later, he commanded Discovery on STS-51D and landed the shuttle safely despite a blown main gear tire. Six months later, Bobko commanded Atlantis on its maiden flight, STS-51J.

"My wife said whenever I was given a chance, I chose the career path toward space," Bobko said. "All spaceflight is beautiful and inspiring."

The astronaut thought he would go into space a lot sooner. The Air Force chose him for its own astronaut corps in 1966 to crew the Manned Orbiting Laboratory, or MOL, a project the Air Force later canceled.

Like STS-1 Pilot Bob Crippen and five others who were in the MOL program, Bobko joined NASA. He worked on the Apollo-Soyuz Test Project as a support team member before flying as a chase pilot on the shuttle prototype Enterprise landing tests.

"Bo loved spaceflight and he wanted everyone working with him to enjoy it as much as he did," said Bobko's presenter, former astronaut Jeff Hoffman. "He enjoyed flying so much that his family said they could judge how close he was getting to a flight because the smile on his face kept getting bigger and bigger and bigger."

Helms, an Air Force veteran like Bobko, flew five times on the shuttle beginning with STS-54 in January 1993. Her spaceflight career included flights on Endeavour, Discovery, Columbia, Atlantis and the International Space Station. She spent more than 5,000 hours in space, with 163 days of that on the station.

"It was one of the most amazing things that I've ever had the chance to do, which was be part of a space outpost" said Lt. Gen. Helm, now commanding the 14th Air Force at Vandenberg Air Force Base, Calif.. "That truly was a human adventure that has no equal."

While on the space station, Helms performed a world-record spacewalk lasting eight hours and 56 minutes.

Endurance was kind of a trademark of Helms, said her presenter, NASA Administrator and former astronaut Charlie Bolden. She went for a jog on one occasion with her dog, Radar, and when she and the dog got back, she said the jog had gone fine.

But Radar went and laid down on the bed for two days.

"She outran the dog," Bolden said.

Bobko and Helms join a group that includes the legends of Mercury, Gemini and Apollo, along with the astronauts who flew the space shuttle on some of its most notable missions.

From **SCHERER**, Page 4

Spaceport News staff about his work with NASA's Apollo Program.

"We watched the first man step down onto the moon on a vague, rough television picture. It was breathtaking for everyone in the program," he said.

Scherer then assumed the role of director at NASA's Dryden Flight Research Center at Edwards Air Force Base in California.

During his tenure at Kennedy from 1975 to 1979, Scherer oversaw the launch of more than 50 satellites and the Apollo-Soyuz Test Project -- the last Apollo mission and the first collaborative mission for the United States and Russia.

He also managed the transformation of the center as NASA geared up for the Space Shuttle Program and was the first to land a plane on the Shuttle Landing Facility (SLF).

"I made about four landings over there with nobody to see me but the alligators. Then went over to the strip and made two touch-and-go's and then a full-stop landing," Scherer recalled during an oral history interview in 2002.

"There was a busload of people that had come out to watch it, a couple of reporters there who had a few questions . . . I said 'That is the most unimportant landing that'll probably ever be made at this facility,'" Scherer joked. "It was quite a thrill. I was a carrier pilot so I'm used to landing in small areas. That runway goes right on out over the horizon."

He returned to NASA Headquarters as associate administrator of external relations until 1980, before becoming a senior executive with General Dynamics Commercial Services Group in San Diego.

Scherer is described as a lifelong advocate of America's space program and often joined the Kennedy work force on launch days and returned for center director forums.

"We have lost one of our biggest boosters, and he will be missed," said current Kennedy Director Bob Cabana. "Please keep his family in your thoughts and prayers."

Scherer is survived by his wife, Sheryn.

Planetary science missions will keep processing team busy

By Linda Herridge
Spaceport News

During a visit to Kennedy Space Center, NASA's Deputy Director for Planetary Science Jim Adams said that even as the last shuttle launch nears, the year of interplanetary missions to planets in our solar system is ramping up. Adams conveyed this message to Kennedy workers, including many from the Launch Services Program (LSP), during a presentation at the Operations and Checkout Building Mission Briefing Room, May 5.

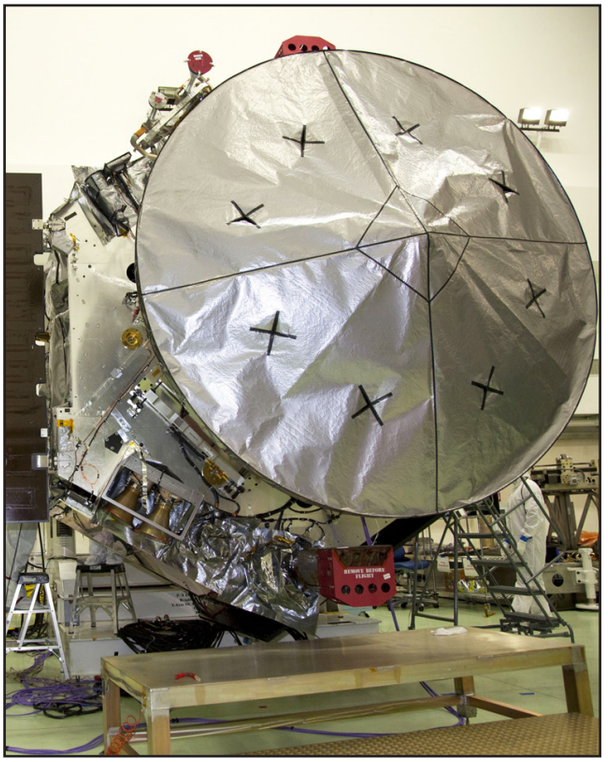
"All of NASA's efforts to explore the solar system run through and depend upon the Launch Services Program as well as the entire Kennedy family that supports it," Adams said. "It's going to be a busy year."

The agency's Juno spacecraft arrived at Kennedy April 8 and was transported to the Astrotech payload processing facility in Titusville, Fla. About 40 Lockheed Martin workers and 20 from the Jet Propulsion Laboratory in Pasadena, Calif., are preparing Juno for its mission. Several workers deployed and tested the Plasma Wave Sensor, called WAVES for short, on the spacecraft.

Prior to that, on March 14, the spacecraft's solar arrays and some ground support equipment arrived. The solar arrays will be installed, followed by an illumination test and magnetometer boom deployment test between May 18 and June 9.

LSP Launch Site Integration Manager Jim Behling said that the large size of the spacecraft is a notable feature.

When stowed for launch, the spacecraft will measure 13 feet high by 15 feet wide. The hexagonal-shaped spacecraft will weigh 7,992 pounds. With its solar arrays deployed, it will inscribe a circle more than 60 feet in diameter.



CLICK ON PHOTO *NASA/Frankie Martin*

Lockheed Martin technicians in the Astrotech payload processing facility in Titusville, Fla., prepare to install, deploy and test the Radio and Plasma Wave Sensor, called WAVES for short, on to NASA's Juno spacecraft on May 1. WAVES is a science boom instrument that will measure radio and plasma waves emitting from Jupiter. Juno is scheduled to launch aboard an Atlas V rocket on Aug. 5, 2011, reaching Jupiter in July 2016. To learn more about Juno, click on the photo.

"I wouldn't say it's a challenge," Behling said. "It is just something that has driven some requirements and has to be taken into account when selecting processing areas."

Adams said that Juno's solar arrays are so big that an adjustment is needed to keep the spacecraft from wobbling. "It's a very cool design," Adams said.

Juno will be carried aboard an Atlas V rocket on Aug. 5, from Launch Complex 41 at Cape Canaveral Air Force Station (CCAFS). The spacecraft will travel to Jupiter and enter the planet's radiation belt to get an accurate view of what the planet looks like. After completing 33 orbits, it will enter the Jovian atmosphere and continue to relay information as long as it remains operational.

Another spacecraft, the Gravity Recovery and Interior Laboratory (GRAIL) also will be processed by LSP.

It is scheduled to arrive May 20 at the Astrotech payload processing facility in Titusville, Fla.

GRAIL will launch on the last Delta II heavy rocket that NASA will use, from Launch Complex 17B at CCAFS, Sept. 8. Adams said the spacecraft will map the internal structure of the moon to determine if its core is solid or liquid.

When NASA's Mars Science Laboratory (MSL) with its Curiosity rover arrives at Kennedy, it will be processed in the Payload Hazardous Servicing Facility (PHSF) in the Industrial Area to prepare it for launch no earlier than Nov. 25.

Three components of MSL, the cruise stage, back shell and heat shield, arrived at Kennedy on May 12 and were transported to the PHSF for processing.

The rover's 10 science instruments will search for signs of life, including methane, and help determine if the gas is from a biological or geological source. The unique rover will use a laser to look inside rocks and release the gases so that its spectrometer can analyze and send the data back to Earth.

MSL will launch on an Atlas V rocket from CCAFS' Complex 41 as well. About nine months later, in August 2012, it will reach Mars. Instead of airbags, the rover is equipped with a unique sky crane that will lower it to the surface after it is jettisoned from the descent stage.

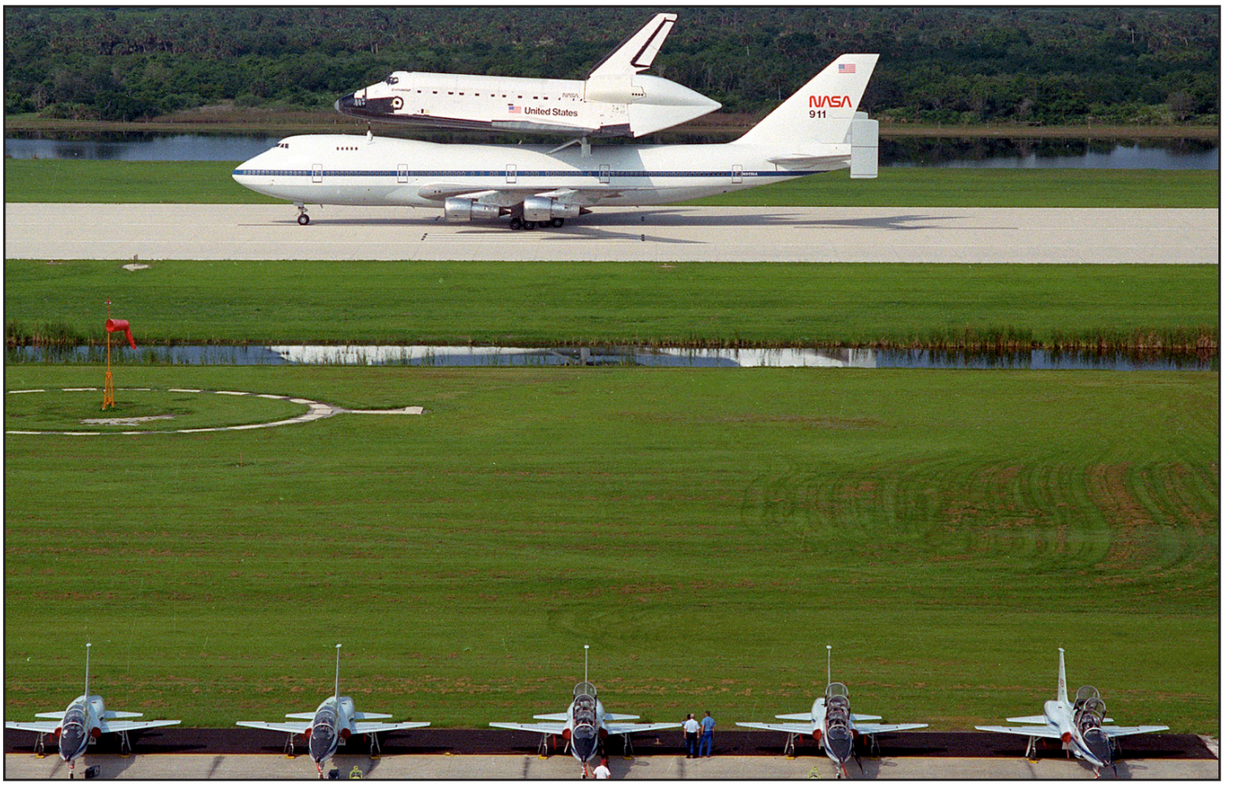
"I'm excited about what MSL is going to tell us about Mars," Adams said. "It will be the largest rover to visit the red planet -- about the size of a Mini Cooper automobile."

CLICK ON PHOTO *NASA/Jack Pfaller*

Workers secure the second stage of a United Launch Alliance Delta II launch vehicle to the first stage at Space Launch Complex 17B on May 10. The payload fairing then will be raised into the white room of the mobile service tower. The Delta II will carry NASA's Gravity Recovery and Interior Laboratory, or GRAIL, spacecraft into lunar orbit. To learn more about GRAIL, click on the photo.

Endeavour arrived from California 20 years ago

By Kay Grinter
Reference Librarian



NASA file/1991

Shuttle Endeavour, arrives at Kennedy Space Center atop the Shuttle Carrier Aircraft, a modified Boeing 747, on May 7, 1991. Endeavour is scheduled to lift off on its final mission May 16 at 8:56 a.m.

Space shuttle Endeavour reported for duty at Kennedy Space Center 20 years ago, touching down at the Shuttle Landing Facility atop a new modified Boeing 747 Shuttle Carrier Aircraft on May 7, 1991.

Rollout from its assembly plant in Palmdale, Calif., was April 25, just days before.

Endeavour was the replacement orbiter for shuttle Challenger, lost in an accident in January 1986. A contract awarded in July 1987 would return the shuttle fleet from three orbiters -- Columbia, Discovery and Atlantis -- to four.

Construction of Orbiter Vehicle-105, or OV-105, began in September. Endeavour's name, though, was not chosen until 1989 and was based on the entries in a national student competition. Endeavour's namesake was a ship chartered to traverse the South Pacific in 1768 and captained by the British explorer James Cook.

Less than four years after construction began, the much-anticipated, newest member of the shuttle family arrived in Florida.

Randy Goodmon, now the flow manager for Endeavour for United Space Alliance, or USA, Kennedy's shuttle processing contractor, was in the firing room when Challenger was lost.

"Challenger was a big part of my life," Goodmon said. "To see a replacement arrive helped fill a void. It's always nice to get new hardware, but if we hadn't gotten Endeavour, the sadness would have continued."

Keeping Endeavour as a spare on the ground, though, was never NASA's goal. The spacecraft was built to fly and Kennedy workers made sure it flew well.

Endeavour has flown 24 missions to date, spending 283 days in orbit and traveling 116,372,930 miles.

On its first mission, STS-49, in May 1992, Endeavour captured the INTELSAT VI communications satellite and re-released it into geosynchronous orbit.

Endeavour carried out the first Hubble Space Telescope servicing mission, STS-61, in December 1993; expertly supported two Space Radar Laboratory missions on STS-59 and STS-68 in April and October 1994; and visited the Russian space station Mir on STS-89 in January 1998.

In recent years, Endeavour made 11 trips to the International Space Station, delivering several vital components including the first U.S. module, the Unity node, on STS-88 in December 1998; Japan's Kibo module on STS-123 in March 2008; and the Tranquility module and cupola on STS-130 in February 2010.

Mike Parrish, USA's vehicle operations chief for Endeavour, summed up the feelings of Endeavour's processing team.

"Endeavour is the positive spirit that resides in all of us," Parrish said. "She is the exuberant pride that is seen on our faces as she heads toward the sky. She is the majestic eagle that provided safe passage to those that sought to fly high on the wings like eagles."

Although construction of a shuttle launch pad at Space Launch Complex-6 on Vandenberg Air Force Base was under way in 1986, Endeavour never got to lift off from California. Work on the project was canceled while NASA focused on returning the space shuttle to flight status.

However, unfavorable weather in Florida did require Endeavour to land at Edwards Air Force Base in California following seven of its 24 missions.

Ray Zink, USA's manager for shuttle recovery operations, explained: "While landing in California means additional work and tighter schedules for the processing teams, having the crew and orbiter back safely is all that matters to us. OV-105 is the 'teenager' of the orbiters, the 'new' one. I am always reminded of that fact when we get her ready to ferry back to KSC. Bolting Endeavour down to the SCA feels like strapping your kid into a roller coaster and watching them smile in expectation of the upcoming ride."

Endeavour also underwent an overhaul, known as Orbiter Maintenance Down Period, in Palmdale, spending eight months between July 1996 and March 1997 in California.

Two other major modification periods were spent at Kennedy. Some of the most significant upgrades included installation of a drag chute, improved nose wheel steering, installation of a space station airlock and orbiter docking system, and a multifunction electronic display system, or "glass cockpit."

On April 12, NASA Administrator Charlie Bolden announced the facilities where the shuttles will be retired at the conclusion of the Space Shuttle Program later this year. Endeavour, which is preparing for its final lift off May 16, will return to the state of its birth, but its old friends from Florida and other visitors always will be welcome in its new home, the California Science Center in Los Angeles.

Added Zink: "I have no doubt she will enjoy her last ride back to California, from a 'slightly' more matured position."

NASA Employees of the Month: May

NASA/Tony Gray

Employees for the month of May are, from left, Art Edwards, Safety and Mission Assurance Directorate; Bob Page, Launch Integration Office; Harry Plaza, Center Operations; Marcelo Dasilva (Employee of the Quarter), Human Resource Office; Linda Shaykhian, Engineering Directorate; Kevin Panik, Launch Vehicle Processing Directorate; Glenn Semmel, Engineering Directorate; and Tung Doan, Launch Services Program. Not pictured are Maria Bland, Education and External Relations; Randy Eastman, Constellation Project Office; and Tara Francisco, Procurement Office.

Looking up and ahead . . .

Scheduled for May 16 Planned for June 1	Launch/KSC: Endeavour, STS-134; 8:56 a.m. EDT Landing/KSC: Endeavour, STS-134; 2:32 a.m. EDT
No Earlier Than June 9	Launch/VAFB: Delta II, Aquarius / SAC-D Satellite; 10:20 a.m. EDT
Targeted for Early July	Launch/KSC: Atlantis, STS-135; TBD Landing/KSC: Atlantis, STS-135; TBD
No Earlier Than July 14	Launch/CCAFS: Atlas V, GPS IIF-2; 2:51 p.m.
Aug. 5	Launch/CCAFS: Atlas V, Juno; 11:40 a.m. EDT
No Earlier Than September	Launch/CCAFS: SpaceX Falcon 9, Dragon C2; TBD
Sept. 8	Launch/CCAFS: Delta II Heavy, GRAIL; 8:37 a.m. to 9:16 a.m. EDT
No Earlier Than Oct. 8	Launch/CCAFS: SpaceX Falcon 9, Dragon C3; TBD
Oct. 25	Launch/VAFB: Delta II Heavy, NPP; 5:47 to 5:57 a.m. EDT
No Earlier Than Nov. 25	Launch/CCAFS: Atlas V, Mars Science Laboratory; 10:21 a.m. EST
No Earlier Than December	Launch/CCAFS: Delta IV-Heavy, NROL-15; TBD
No Earlier Than Dec. 7	Launch/CCAFS: SpaceX Falcon 9, Dragon C4; TBD
Early 2012	Launch/CCAFS: Atlas V, AEHF 2; TBD

Kennedy Space Center Activities

2011 KSC Spring Flag Football League Standings and Upcoming Schedule

TEAM	RECORD	POINTS SCORED	POINTS ALLOWED
Islaughter	6-1	194	73
Stuffers	6-1	163	40
Rowdies	4-3	128	91
Blood Hunters	2-5	65	128
Redheads	2-5	46	133
FAT	1-6	16	147

Week 9 Schedule (May 18)
5:30 p.m. - FAT vs. Blood Hunters
6:30 p.m. - Stuffers vs. Islaughters
7:30 p.m. - Rowdies vs. Redheads

Playoff (Week 10) (May 25)
5 p.m. - 4 vs. 5 6 p.m. - 3 vs. 6
7 p.m. - 1 vs. Game 1 Winner
8 p.m. - 2 vs. Game 2 Winner

Games are played Wednesdays at KARS Park I. For more information, contact Matt Jimeniz at 321-867-4509 or **matthew.j.jimeniz@nasa.gov**.

2011 KSC Tennis League Rankings, Leaders and Upcoming Schedule

Singles

Group 1 Rankings	Group 2 Rankings	Group 3 Rankings	Group 4 Rankings	May 12 Schedule
Ken Young	Alan Wheeler	James Hudleston	Lashelle McCoy	Young vs. Ingham
Bob Ingham	Calvert Staubus	Kate Liu	Sergio Briceno	Specht vs. Hosan
Billy Specht	Scott DeWitt	Laura Scott		Wheeler vs. Staubus
Norm Hosan	Kevin Panik	Kyle Nowlin		DeWitt vs. Panik
				Hudleston vs. Liu
				Scott vs. Nowlin
				McCoy vs. Briceno

The league seeks new players and is open to all Kennedy civil service and contractor personnel and dependents. Matches are played Thursdays at KARS Park I and II. For more information, contact Alan Wheeler at 321-867-3565 or **alan.j.wheeler@nasa.gov**.

Doubles

COURT LEADERS FROM MAY 10

Court 9 - Scott Schilling	Court 7 - Jay Hebert	Court 4 - Amy Lombardo	Court 2 - TBD
Court 8 - Andy Maffe	Court 6 - Tom Li	Court 3 - Laura Scott	Court 1 - TBD

COURT GROUPS FOR MAY 17

Court 9	Court 8	Court 7	Court 6
Rod Downing	Dave Davies	Miguel Rodriguez	Alan Wheeler
Bo Prichard	Art Shutt	Ray Jones	Tom Li
Chip Hooper	Andy Maffe	Jeff Andress	Norm Ring
Ron Feile	Jay Hebert	Brian Klein	Teresa Bollig
Court 4	**Court 3**	**Court 2**	**Court 1**
Kyle Nowlin	Laura Rochester	TBD	TBD
Amy Lombardo	Debbie dela Fuenta		
Kate Liu	Laura Scott		
Jane Mosconi			

The league seeks new players and is open to all Kennedy civil service and contractor personnel and dependents. Matches are played Tuesdays at KARS Park I and II. For more information, contact Teresa Bollig at 321-264-8575 or **teresa.e.bollig@nasa.gov**.

John F. Kennedy Space Center

Spaceport News

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